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10/585,205	05/23/2007	Chiaki Sotowa	Q79327	9588

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EXAMINER	
CANTELMO, GREGG	

ART UNIT	PAPER NUMBER
1726	

NOTIFICATION DATE	DELIVERY MODE
11/19/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/585,205	SOTOWA ET AL.	
	Examiner	Art Unit	
	Gregg Cantelmo	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-37* is/are pending in the application.

4a) Of the above claim(s) *4-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received November 8, 2010:

a. Claims 1 and 3-37 are pending with claims 4-37 withdrawn from consideration.

b. The specification objection has been overcome in light of the amendment;

c. The prior art rejections stand as modified in light of the amendment to the claims. The new grounds of rejection are necessitated by the amendment. Thus this action is final.

Election/Restrictions

2. Applicant's specific traversal of claims 15 and 21 in the reply filed on November 8, 2010 is acknowledged but is not considered timely as there is no reason or evidence as to why these specific traversal arguments were not presented in Applicant's prior response. Furthermore, Applicant's prior response filed June 3, 2010 was an election **without** traverse. As such, it is unclear as to why subsequent traversal arguments have been presented since Applicant has already elected without traverse.

Regardless, as previously set forth:

An international application should relate to only one invention or, if there is more than one invention, the inclusion of those inventions in one international application is only permitted if all inventions are so linked as to form a single general inventive concept (PCT Rule 13.1). With respect to a group of inventions claimed in an international application, unity of invention exists only when there is a technical

relationship among the claimed inventions involving one or more of the same or corresponding special technical features. unity of invention exists only when there is a technical relationship among the claimed inventions involving one or more special technical features. The term "special technical features" is defined as meaning those technical features that define a contribution which each of the inventions considered as a whole, makes over the prior art. Lack of unity can be established "a posteriori" in light of prior art wherein the prior art teaches that some of the claimed inventions lack recitation of a common special technical feature. According to the corresponding ISR, JP 11-176442 is held to teach the invention of at least claim 1. Thus original claim 1 lacks a special technical feature and the claims lack a common special technical feature. Therefore lack of unity of invention exists and restriction is proper.

Upon Election of Group I, the following species requirement is presented:

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

Claim 3, wherein the technical feature therein is directed to the amount of carbon fiber and SBR on the basis of the total amount of active substance, binder and carbon fiber;

Claims 15 and 21, wherein the technical feature therein is directed to the active substance being a non-graphite carbon material.

The various species above fail to correspond to a common special technical feature. Applicant has elected the invention of claim 3. The invention of claims 15 and 21 are not limited to the same technical feature of claim 3 and thus fail to correspond to a common special technical feature.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise require all the limitations of an allowed generic claim.

REQUIREMENT FOR UNITY OF INVENTION

As provided in 37 CFR 1.475(a), a national stage application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept ("requirement of unity of invention"). Where a group of inventions is claimed in a national stage application, the requirement of unity of invention shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

The determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim. See 37 CFR 1.475(e).

WHEN CLAIMS ARE DIRECTED TO MULTIPLE CATEGORIES OF INVENTIONS

As provided in 37 CFR 1.475(b), a national stage application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the following combinations of categories:

(1) A product and a process specially adapted for the manufacture of said product; or

(2) A product and process of use of said product; or

(3) A product, a process specially adapted for the manufacture of the said product, and a use of the said product; or

(4) A process and an apparatus or means specifically designed for carrying out the said process; or

(5) A product, a process specially adapted for the manufacture of the said product, and an apparatus or means specifically designed for carrying out the said process.

Otherwise, unity of invention might not be present. See 37 CFR 1.475(c).

A similar lack of unity was presented in the international application with, given the lack of a special technical feature common to dependent claims, each dependent claim is then specific to its own special technical feature. In the international application only claim 1 and one dependent claim to claim 1 (claim 2) were considered with respect to the special technical feature of claim 2. This special technical feature, not recited in any of the remaining dependent claims is basis for withdrawing these other dependent

claims for while they do not exclude the features of claim 2, they do not require any such special technical feature and thus fail to correspond to a single invention.

The reasoning set forth in the ISRs lack of unity was similarly applied to this national stage application. Since claim 1 lacks a special technical feature, then none of the dependent claims correspond to the same common special technical feature, and each dependent claim then corresponds to its own special technical feature. Given that elected claim 3 is not recited in any of claims 2 and 4-21 then only claim 3 is elected since the special technical features recited therein (the amount of carbon fiber, amount of SBR based on the total amount of active substance, binder and carbon fiber) since none of claims 2 and 4-21 require this special technical feature.

Therefore claims 4-21, and specifically claims 15 and 21 remain withdrawn from consideration in accordance with unity of invention practice as to species which do not correspond to the elected species (claim 3) special technical features.

Action on the merits of claims 1 and 3 follows.

Specification

3. The disclosure is objected to because of the following informalities: the claim listing in the specification (starting on page 6) no longer agrees with the currently amended claim set filed November 8, 2010. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1 and 3 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The lower limit of the glass transition temperature (T_g) of claim 1 critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). The specification fails to give any reasonable guidance as to the range of glass transition temperatures and SBR compositions which fall within the invention. The lower limit is never clearly specified and the specification fails to give sufficient disclosure for Applicant to claim the range now recited in claim 1.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1 and 3 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term “or lower” in claim 1 is indefinite since neither the claims not the specification give reasonable guidance as to what glass transition temperatures the term “or lower" encompassed at the time the claimed invention was made.

Claim Rejections - 35 USC § 103

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka as in view of either U.S. Patent No. 5,631,100 (Yoshino) or “Performance binder for lithium ions” Zeon Chemicals (Advanced Battery Technology 2003 publication).

Otsuka discloses a negative electrode material for a lithium battery comprising mesobead black powder and graphite carbon fiber (abstract and para. 24). The graphite

active material has a specific surface area of 0.7 m2/g or more and 5.0 m2/g or less (abstract as applied to claim 1). The active material further includes a styrene butadiene rubber (SBR) binder (para. 24). The carbon fiber has a diameter of 0.1 micrometers or more to 0.3 micrometers or less (para. 17).

Otsuka does not teach of the claimed average particle size and glass transition temperature requirement of claim 1.

Yoshino teaches of electrode binder materials including SBR materials where the SBR has 40-95% butadiene thus preferably less than 50% styrene and has a preferred particle diameter in the range of 0.01-0.3 micrometers (col. 7). The binder therein, having a higher degree of butadiene relative to styrene will inherently have a glass transition temperature of 0oC or less.

The motivation for using the particular SBR binder of Yoshino is that it is taught to have superior binding ability and uniformity of the active material mixture which would expectedly improve the electrochemical efficiency and cycling of the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Otsuka by selecting the SBR material of Otsuka to have the particular characteristics and properties as taught by Yoshino since it would have improved the binding and uniformity of the active material and subsequently would have expectedly improved the electrochemical efficiency and cycling of the electrode. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin,

227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07. See also KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007).

Alternatively, Zeon Chemicals as discussed in the Advanced Battery Technology publication also recognized the use of low glass transition temperature SBR materials used as a binder material in lithium negative electrodes. BM-400B is held to exhibit the same physical characteristics, glass transition temperature and average particle diameter as that recited in claim 1, absent clear evidence to the contrary.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Otsuka by using the SBR material of Zeon Chemicals as described in the Advanced Battery Technology publication since it would have provide a binder material having excellent binding properties while requiring less binder. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07. See also KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (U.S. 2007).

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka in view of either Yoshino or the Zeon Chemicals - Advanced Battery Technology publication as applied to claim 1 in view of U.S. Patent No. 6,998,192 (Yumoto) or U.S. Patent No. 6,037,095 (Miyasaka).

The weight ratio of the active material (mesophase black lead) to the carbon fiber is 93:3 to 80:20 and preferably 95:5-90:10. The specific mixture in the example of para.

24 of Otsuka is a weight ratio of 93:7, graphite to fiber. This ratio is further mixed with an unspecified amount of SBR binder.

SBR binders are understood in the art to exhibit superior tackiness, improving the flexibility of the electrode while requiring less binder to the mixture to adequately bind the mixture. Using a smaller amount of SBR to achieve sufficient adhesion of the active material components would expectedly reduce the internal resistance and increase the capacity of the battery since it would increase the proportion of active material relative to the binder and in the case of Otsuka increase the active material relative to both the binder and the already disclosed limited fiber presence. Thus for the weight ratio of 93:7 wt% (active material to carbon fiber) as disclosed in para. 24 of Otsuka which is further combined with an SBR binder, it would have been within the skill of the worker in the art to envision SBR binder amounts in the claimed range as a result effective variable which provides sufficient tackiness at a lower amount of binder and thus would have a significantly greater active material ratio to the fiber and binder. This high active material ratio would thus provide an electrode having superior capacity.

By example, Yumoto teaches of a negative electrode mixture including carbonaceous materials and an SBR component where the SBR binder is present in an amount up to 5wt% to impart binding and elasticity to the electrode (col.1, ll. 40-60). Miyasaka also teaches of using an SBR binder at 4 wt% in a carbonaceous negative electrode (col. 12, ll. 45-50).

Therefore SBR binders in amounts of less than 6 wt% are commonly used in the art to provide a sufficient degree of binding while maximizing the amount of active

material in the electrode and also improving the flexibility of the electrode material. Maximizing the amount of active material also maximizes the capacity of the electrode material.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Otsuka to limit the amount of SBR binder therein to a range of up to 5 wt% as suggested by Yumoto or Miyasaka since it would have provided a sufficient degree of binding while having maximized the amount of active material in the electrode and also improved the flexibility of the electrode material. Maximizing the amount of active material would have also maximized the capacity of the electrode material.

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Response to Arguments

8. Applicant's arguments with respect to claims 1 and 3 have been considered but are moot in view of the new ground(s) of rejection.

SBR binder materials exhibiting the same properties as that in claim 1 are readily recognized in the art as suitable electrode active material binders as evidenced by both Otsuka in view of either Yoshino or the Advanced Battery Technology 2003 publication as discussed above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/
Primary Examiner
Art Unit 1726